January 30, 2019

VIA FOIAONLINE.REGULATIONS.GOV
U.S. Environmental Protection Agency

Re: Freedom of Information Act Request: Chlorpyrifos Biological Opinion RPA Implementation

Dear FOIA Officer:

This is a request under the Freedom of Information Act, 5 U.S.C. § 552, *as amended* ("FOIA"), from the Center for Biological Diversity ("Center"), a non-profit organization that works to secure a future for all species hovering on the brink of extinction through science, law, and creative media, and to fulfill the continuing educational goals of its membership and the general public in the process.

REQUESTED RECORDS

With respect to the December 29, 2017 Biological Opinion ("BiOp") on the U.S. Environmental Protection Agency's ("EPA") Registration of Pesticides containing Chlorpyrifos, Diazinon, and Malathion, Attachment A (Biological Opinion), the Center requests the following records from January 1 2018 to the date EPA conducts this search:

1. The records, including but not limited to communications with the National Marine Fisheries Service ("NMFS"), mentioning EPA's development and implementation of an "effectiveness monitoring plan" in close coordination with NMFS Office of Protected Resources to ensure the elements of the chlorpyrifos Reasonable and Prudent Measures are feasible, effective, and implemented as described in the BiOp Chapter 26. *Id.*;

2. The records, including but not limited to communications with NMFS, mentioning EPA EPA's development and implementation of an "effectiveness monitoring plan" in close coordination with NMFS Office of Protected Resources to ensure the elements of the diazinon Reasonable and Prudent Measures are feasible, effective, and implemented as described in the BiOp Chapter 26. *Id.*;

3. The records, including but not limited to communications with NMFS, mentioning EPA's development and implementation of an "effectiveness monitoring plan" in close coordination with NMFS Office of Protected Resources to ensure the elements of the malathion Reasonable and Prudent Measures are feasible, effective, and implemented as described in the BiOp Chapter 26. *Id.*;

4. The records, including but not limited to communications with NMFS, mentioning EPA's development and implementation of an "effectiveness monitoring plan" for aquatic habitats as described in the BiOp Chapter 26. *Id.*;

5. The reports summarizing annual monitoring data, including but not limited to all raw data required to be submitted to NMFS Office of Protected Resources, including but not limited to reports summarizing annual monitoring data and/or providing raw data as described in the BiOp Chapter 26. *Id*.;

6. The records of incidents where listed species appear injured or killed as a result of pesticide applications that are to be reported to NMFS's Office of Protected Resources ("OPR") at the phone number (301) 713-1401 and EPA's Office of Pesticide Programs as required by the BiOp Chapter 26. *Id.*;

7. The records any incidences regarding chlorpyrifos, diazinon, and malathion effects on aquatic ecosystems added to its incident database that it has classified as probable or highly probable as required by the BiOp Chapter 26. *Id.*; and

8. The records, including but not limited to communications with NMFS, mentioning EPA providing OPR a commencement date for annual reporting of monitoring results as required by the BiOp Chapter 26.

For this request, the term "records" refers to, but is not limited to, any and all documents, correspondence (including, but not limited to, inter and/or intra-agency correspondence as well as correspondence with entities or individuals outside the federal government), emails, letters, notes, recordings, telephone records, voicemails, telephone notes, telephone logs, text messages, chat messages, minutes, memoranda, comments, files, presentations, consultations, biological opinions, assessments, evaluations, schedules, papers published and/or unpublished, reports, studies, photographs and other images, data (including raw data, GPS or GIS data, UTM, LiDAR, etc.), maps, and/or all other responsive records, in draft or final form.

This request is not meant to exclude any other records that, although not specially requested, are reasonably related to the subject matter of this request. If you or your office have destroyed or determine to withhold any records that could be reasonably construed to be responsive to this request, I ask that you indicate this fact and the reasons therefore in your response.

Under the FOIA Improvement Act of 2016, agencies are prohibited from denying requests for information under FOIA unless the agency reasonably believes release of the information will harm an interest that is protected by the exemption. FOIA Improvement Act of 2016 (Public Law No. 114-185), codified at 5 U.S.C. § 552(a)(8)(A).

Should you decide to invoke a FOIA exemption, please include sufficient information for us to assess the basis for the exemption, including any interest(s) that would be harmed by release. Please include a detailed ledger which includes:

1. Basic factual material about each withheld record, including the originator, date, length, general subject matter, and location of each item; and

2. Complete explanations and justifications for the withholding, including the specific exemption(s) under which the record (or portion thereof) was withheld and a full explanation of how each exemption applies to the withheld material. Such statements will be helpful in deciding whether to appeal an adverse determination. Your written justification may help to avoid litigation.

If you determine that portions of the records requested are exempt from disclosure, we request that you segregate the exempt portions and mail the non-exempt portions of such records to my attention at the address below within the statutory time limit. 5 U.S.C. § 552(b).

The Center is willing to receive records on a rolling basis.

Finally, agencies must preserve all the records requested herein while this FOIA is pending or under appeal. The agency shall not destroy any records while they are the subject of a pending request, appeal, or lawsuit under the FOIA. 40 C.F.R. § 2.106; *see Chambers v. U.S. Dep't of Interior*, 568 F.3d 998, 1004 (D.C. Cir. 2009) ("an agency is not shielded from liability if it intentionally transfers or destroys a document after it has been requested under FOIA or the Privacy Act").

If any of the requested records are destroyed, the agency and responsible officials are subject to attorney fee awards and sanctions, including fines and disciplinary action. A court held an agency in contempt for "contumacious conduct" and ordered the agency to pay plaintiff's costs and fees for destroying "potentially responsive material contained on hard drives and email backup tapes." *Landmark Legal Found. v. EPA*, 272 F.Supp.2d 59, 62 (D.D.C. 2003); *see also Judicial Watch, Inc. v. Dep't of Commerce*, 384 F. Supp. 2d 163, 169 (D.D.C. 2005) (awarding attorneys' fees and costs because, among other factors, agency's "initial search was unlawful and egregiously mishandled and …likely responsive documents were destroyed and removed"), aff'd in relevant part, 470 F.3d 363, 375 (D.C. Cir. 2006) (remanding in part to recalculate attorney fees assessed). In another case, in addition to imposing a $10,000 fine and awarding attorneys' fees and costs, the court found that an Assistant United States Attorney prematurely "destroyed records responsive to [the] FOIA request while [the FOIA] litigation was pending" and referred him to the Department of Justice's Office of Professional Responsibility. *Jefferson v. Reno*, 123 F. Supp. 2d 1, 6 (D.D.C. 2000).

FORMAT OF REQUESTED RECORDS

Under FOIA, you are obligated to provide records in a readily accessible electronic format and in the format requested. *See, e.g.*, 5 U.S.C. § 552(a)(3)(B) ("In making any record available to a person under this paragraph, an agency shall provide the record in any form or format requested by the person if the record is readily reproducible by the agency in that form or format."). "Readily accessible" means text-searchable and OCR-formatted. *See* 5 U.S.C. § 552(a)(3)(B). Pursuant to this requirement, we hereby request that you produce all records in an electronic format and in their native file formats. Additionally, please provide the records in a load-ready

format with a CSV file index or Excel spreadsheet. If you produce files in .PDF format, then please omit any "portfolios" or "embedded files." Portfolios and embedded files within files are not readily accessible. Please do not provide the records in a single, or "batched," .PDF file. We appreciate the inclusion of an index.

If you should seek to withhold or redact any responsive records, we request that you: (1) identify each such record with specificity (including date, author, recipient, and parties copied); (2) explain in full the basis for withholding responsive material; and (3) provide all segregable portions of the records for which you claim a specific exemption. 5 U.S.C. § 552(b). Please correlate any redactions with specific exemptions under FOIA.

RECORD DELIVERY

We appreciate your help in expeditiously obtaining a determination on the requested records. As mandated in FOIA, we anticipate a reply within 20 working days. 5 U.S.C. § 552(a)(6)(A)(i). Failure to comply within the statutory timeframe may result in the Center taking additional steps to ensure timely receipt of the requested materials. Please provide a complete reply as expeditiously as possible. You may email or mail copies of the requested records to:

Center for Biological Diversity
P.O. Box 11374
Portland, OR 97211
foia@biologicaldiversity.org

If you find that this request is unclear, or if the responsive records are voluminous, please email me to discuss the scope of this request.

REQUEST FOR FEE WAIVER

FOIA was designed to provide citizens a broad right to access government records. FOIA's basic purpose is to "open agency action to the light of public scrutiny," with a focus on the public's "right to be informed about what their government is up to." *NARA v. Favish*, 541 U.S. 157, 171 (2004) quoting *U.S. Dep't of Justice v. Reporters Comm. for Freedom of Press*, 489 U.S. 749, 773-74 (1989) (internal quotation and citations omitted). In order to provide public access to this information, FOIA's fee waiver provision requires that "[d]ocuments shall be furnished without any charge or at a [reduced] charge," if the request satisfies the standard. 5 U.S.C. § 552(a)(4)(A)(iii). FOIA's fee waiver requirement is "liberally construed." *Judicial Watch, Inc. v. Rossotti*, 326 F.3d 1309, 1310 (D.C. Cir. 2003); *Forest Guardians v. U.S. Dept. of Interior*, 416 F.3d 1173, 1178 (10th Cir. 2005).

The 1986 fee waiver amendments were designed specifically to provide non-profit organizations such as the Center access to government records without the payment of fees. Indeed, FOIA's fee waiver provision was intended "to prevent government agencies from using high fees to discourage certain types of requesters and requests," which are "consistently associated with requests from journalists, scholars, and *non-profit public interest groups*." *Ettlinger v. FBI*, 596 F.Supp. 867, 872 (D. Mass. 1984) (emphasis added). As one Senator stated, "[a]gencies should

not be allowed to use fees as an offensive weapon against requesters seeking access to Government information ... ." 132 Cong. Rec. S. 14298 (statement of Senator Leahy).

I. The Center Qualifies for a Fee Waiver.

Under FOIA, a party is entitled to a fee waiver when "disclosure of the information is in the public interest because it is likely to contribute significantly to public understanding of the operations or activities of the [Federal] government and is not primarily in the commercial interest of the requester." 5 U.S.C. § 552(a)(4)(A)(iii). EPA's regulations at 40 C.F.R. § 2.107(l)(1)-(3) establish the same standard.

Thus, EPA must consider four factors to determine whether a request is in the public interest: (1) whether the subject of the requested records concerns "the operations or activities of the Federal government," (2) whether the disclosure is "likely to contribute" to an understanding of government operations or activities, (3) whether the disclosure "will contribute to public understanding" of a reasonably broad audience of persons interested in the subject, and (4) whether the disclosure is likely to contribute "significantly" to public understanding of government operations or activities. 15 C.F.R. § 4.11(l)(2)(i) – (iv). As shown below, the Center meets each of these factors.

A. The Subject of This Request Concerns "The Operations and Activities of the Government."

The subject matter of this request concerns the operations and activities of EPA. This request asks for records concerning the December 29, 2017 BiOp on EPA's Registration of Pesticides containing Chlorpyrifos, Diazinon, and Malathion. Attachment A.

This FOIA will provide the Center and the public with crucial insight into EPA's work with toxic pesticides. It is clear that a federal agency's implementation of the BiOp on EPA's registration of pesticides is a specific and identifiable activity of the government, and in this case, it is the executive branch agency of EPA. *Judicial Watch*, 326 F.3d at 1313 ("[R]easonable specificity is all that FOIA requires with regard to this factor") (internal quotations omitted). Thus, the Center meets this factor.

B. Disclosure is "Likely to Contribute" to an Understanding of Government Operations or Activities.

The requested records are meaningfully informative about government operations or activities and will contribute to an increased understanding of those operations and activities by the public.

Disclosure of the requested records will allow the Center to convey to the public information about the implementation of EPA's BiOp regarding registration of toxic pesticides. The Center will use the records to understand the impacts of pesticides on endangered species nationwide. Once the information is made available, the Center will analyze it and present it to its 1.4 million members and online activists and the general public in a manner that will meaningfully enhance the public's understanding of this topic.

Thus, the requested records are likely to contribute to an understanding of EPA's operations and activities.

C. Disclosure of the Requested Records Will Contribute to a Reasonably Broad Audience of Interested Persons' Understanding of the Implementation of the Chlorpyrifos BiOP.

The requested records will contribute to public understanding of whether EPA's actions are consistent with EPA's mission to "to protect human health and the environment."[1]

The activities of EPA generally, and specifically its implementation of pesticide BiOps are areas of interest to a reasonably broad segment of the public. The Center will use the information it obtains from the disclosed records to educate the public at large. *See W. Watersheds Proj. v. Brown*, 318 F.Supp.2d 1036, 1040 (D. Idaho 2004) ("... find[ing] that WWP adequately specified the public interest to be served, that is, educating the public about the ecological conditions of the land managed by the BLM and also how … management strategies employed by the BLM may adversely affect the environment.").

Through the Center's synthesis and dissemination (by means discussed in Section II, below), disclosure of information contained in and gleaned from the requested records will contribute to a broad audience of persons who are interested in the subject matter. *Ettlinger v. FBI*, 596 F.Supp. at 876 (benefit to a population group of some size distinct from the requester alone is sufficient); *Carney v. Dep't of Justice*, 19 F.3d 807, 815 (2d Cir. 1994), *cert. denied*, 513 U.S. 823 (1994) (applying "public" to require a sufficient "breadth of benefit" beyond the requester's own interests); *Cmty. Legal Servs. v. Dep't of Hous. & Urban Dev.*, 405 F.Supp.2d 553, 557 (E.D. Pa. 2005) (in granting fee waiver to community legal group, court noted that while the requester's "work by its nature is unlikely to reach a very general audience," "there is a segment of the public that is interested in its work").

Indeed, the public does not currently have an ability to easily evaluate the requested records, which are not currently in the public domain. *See Cmty. Legal Servs. v. HUD*, 405 F.Supp.2d 553, 560 (D. Pa. 2005) (because requested records "clarify important facts" about agency policy, "the CLS request would likely shed light on information that is new to the interested public."). As the Ninth Circuit observed in *McClellan Ecological Seepage Situation v. Carlucci*, 835 F.2d 1282, 1286 (9th Cir. 1987), "[FOIA] legislative history suggests that information [has more potential to contribute to public understanding] to the degree that the information is new and supports public oversight of agency operations… ."[2]

[1] EPA, *About EPA: Our Mission and What We Do*, https://www.epa.gov/aboutepa/our-mission-and-what-we-do (last visited Jan. 29, 2019).

[2] In this connection, it is immaterial whether any portion of the Center's request may currently be in the public domain because the Center requests considerably more than any piece of information that may currently be available to other individuals. *See Judicial Watch*, 326 F.3d at 1315.

Disclosure of these records is not only "likely to contribute," but is certain to contribute, to public understanding of the implementation of the BiOp. The public is always well served when it knows how the government conducts its activities, particularly matters touching on legal questions. Hence, there can be no dispute that disclosure of the requested records to the public will educate the public about this topic.

D. Disclosure is Likely to Contribute Significantly to Public Understanding of Government Operations or Activities.

The Center is not requesting these records merely for their intrinsic informational value. Disclosure of the requested records will significantly enhance the public's understanding of the effects that pesticides have on environmental and human health, as compared to the level of public understanding that exists prior to the disclosure. Indeed, public understanding will be *significantly* increased as a result of disclosure because the requested records will help reveal more about this subject matter.

The records are also certain to shed light on EPA's compliance with its mission.[3] Such public oversight of agency action is vital to our democratic system and clearly envisioned by the drafters of the FOIA. Thus, the Center meets this factor as well.

II. The Center has a Demonstrated Ability to Disseminate the Requested Information Broadly.

The Center is a non-profit organization that informs, educates, and counsels the public regarding environmental issues, policies, and laws relating to environmental issues. The Center has been substantially involved in the activities of numerous government agencies for over 25 years, and has consistently displayed its ability to disseminate information granted to it through FOIA.

In consistently granting the Center's fee waivers, agencies have recognized: (1) that the information requested by the Center contributes significantly to the public's understanding of the government's operations or activities; (2) that the information enhances the public's understanding to a greater degree than currently exists; (3) that the Center possesses the expertise to explain the requested information to the public; (4) that the Center possesses the ability to disseminate the requested information to the general public; (5) and that the news media recognizes the Center as an established expert in the field of imperiled species, biodiversity, and impacts on protected species. The Center's track record of active participation in oversight of governmental activities and decision making, and its consistent contribution to the public's understanding of those activities as compared to the level of public understanding prior to disclosure are well established.

The Center intends to use the records requested here similarly. The Center's work appears in more than 2,500 news stories online and in print, radio and TV per month, including regular reporting in such important outlets as *The New York Times*, *Washington Post*, *The Guardian*, and *Los Angeles Times*. Many media outlets have reported on the adverse impact pesticides have on

[3] *See supra* note 1.

the environmental and human health, utilizing information obtained by the Center from federal agencies. In 2018, more than 2.5 million people visited the Center's extensive website and viewed pages a total of 4.3 million times. The Center sends out more than 277 email newsletters and action alerts per year to more than over 1.4 million members and supporters. Three times a year, the Center sends printed newsletters to more than 69,500 members. More than 420,000 people have "liked" the Center on Facebook, and there are regular postings regarding environmental protection. The Center also regularly tweets to more than 71,200 followers on Twitter. The Center intends to use any or all of these far-reaching media outlets to share with the public information obtained as a result of this request.

Public oversight and enhanced understanding of EPA's duties is absolutely necessary. In determining whether disclosure of requested information will contribute significantly to public understanding, a guiding test is whether the requester will disseminate the information to a reasonably-broad audience of persons interested in the subject. *Carney v U.S. Dept. of Justice*, 19 F.3d 807 (2nd Cir. 1994). The Center need not show how it intends to distribute the information, because "[n]othing in FOIA, the [agency] regulation, or our case law require[s] such pointless specificity." *Judicial Watch*, 326 F.3d at 1314. It is sufficient for the Center to show how it distributes information to the public generally. *Id.*

III. Obtaining the Requested Records is of No Commercial Interest to the Center.

Access to government records, disclosure forms, and similar materials through FOIA requests is essential to the Center's role of educating the general public. Founded in 1994, the Center is a 501(c)(3) nonprofit conservation organization (EIN: 27-3943866) with more than 1.4 million members and online activists dedicated to the protection of endangered and threatened species and wild places. The Center has no commercial interest and will realize no commercial benefit from the release of the requested records.

IV. Conclusion

For all of the foregoing reasons, the Center qualifies for a full fee waiver. We hope that EPA will immediately grant this fee waiver request and begin to search and disclose the requested records without any unnecessary delays.

If you have any questions, please contact me at foia@biologicaldiversity.org. All records and any related correspondence should be sent to my attention at the address below.

Sincerely,

Ann K. Brown
Open Government Coordinator
CENTER FOR BIOLOGICAL DIVERSITY
P.O. Box 11374
Portland, OR 97211-0374

foia@biologicaldiversity.org

Attachment

Attachment A (Biological Opinion)

Attachment A

CHAPTER 26

REASONABLE AND PRUDENT ALTERNATIVES; REASONABLE AND PRUDENT MEASURES; TERMS AND CONDITIONS; INCIDENTAL TAKE STATEMENT; CONSERVATION RECOMMENDATIONS; REINITIATION NOTICE

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26 REASONABLE AND PRUDENT ALTERNATIVES & REASONABLE AND PRUDENT MEASURES

26.1 RPA Introduction

When the National Marine Fisheries Service (NMFS) concludes that an action is likely to jeopardize an Endangered Species Act (ESA)-listed species or destroy or adversely modify critical habitat, NMFS suggests a reasonable and prudent alternative (RPA) that would allow the action to proceed in compliance with section 7(a)(2) and that can be taken by the action agency and the applicant (ESA Section 7(a)(3)(A)). Joint NMFS and U.S. Fish and Wildlife Service regulations (50 CFR §402.02) implementing section 7 define "jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a ESA-listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR §402.02). As noted above, NMFS relies on statutory language to determine adverse modification.

The NMFS' implementing regulations define reasonable and prudent alternatives as alternative actions, identified during formal consultation, that: (1) can be implemented in a manner consistent with the intended purpose of the action; (2) can be implemented consistent with the scope of the action agency's legal authority and jurisdiction; (3) are economically and technologically feasible; and (4) NMFS believes would avoid the likelihood of jeopardizing the continued existence of ESA-listed species or resulting in the destruction or adverse modification of critical habitat (50 CFR §402.02). The overarching requirement is that an RPA must be capable of avoiding jeopardizing ESA-listed species and adversely modifying critical habitat – all other elements of the definition must be evaluated within this context (*Greenpeace v. NMFS*, 55 F. Supp. 2d 1248, 1268 (W.D. Wa. 1999)). NMFS in the preamble to the final section 7 regulations make clear that the overriding consideration is whether a RPA avoids the likelihood of jeopardy. NMFS notes that the action agency's responsibility "permeates the full range of discretionary authority held by the action agency." Thus, NMFS can specify an RPA that involves the maximum exercise of the action agency's authority when the Services deem necessary to avoid the likelihood of jeopardy (51 FR 19926, 19937 (June 3, 1986)).

The other three factors are intended to implement the statutory phrase "can be taken." The third factor, technological and economic feasibility, refers to the ability of the federal agency to implement the RPA: "[t]he requirement that a RPA be 'economically and technologically feasible' only requires that the Corps have the resources and technology necessary to implement the RPA." *In Re: Operation of the Missouri River System Litigation.* 363 F. Supp. 2d 1145, 1161 (D. Minn. 2004), citing *Kandra v. U.S.*, 145 F.Supp. 2d 1192, 1207 (D. Ore.) ("the RPAs must be economically and technically feasible for *the government* to implement."); see also San Luis & Delta-Mendota Water Authority v. Jewell, 2014 WL 975130 at 38-40 (C.A.9 (Cal.)). This regulatory factor was included in the final section 7 implementing regulations in response to a comment, without further explanation or discussion. The ESA contains no requirement for analysis of economic impacts resulting from implementation of a RPA, and the insertion of the phrase "economically feasible" in regulation cannot create this requirement. Any obligation that NMFS "balance the benefit to the species against the economic and technical burden on the industry before approving an RPA would be fundamentally inconsistent with the purposes of the

ESA and with case law interpreting the Act." *Greenpeace v. NMFS,* 55 F. Supp. 2d 1248, 1267 (W.D. Wash. 1999). While the Services will defer in most cases to the action agency's expertise as to whether a RPA is reasonable, including whether the RPA is technologically and economically feasible, the Services cannot abdicate their duty to formulate and recommend RPAs (51 FR at 19952). However, the action agency may choose or may be obligated to conduct an economic analysis and to evaluate impacts to interests other than the applicants when it implements a RPA pursuant to its authorities.

In this Opinion, NMFS concluded that the Environmental Protection Agency's (EPA's) proposed registration of chlorpyrifos, diazinon and malathion is likely to jeopardize 38 listed species and likely to adversely modify or destroy the designated critical habitat of 37 species. NMFS reached these conclusions because predicted concentrations of these three a.i.s are likely to have direct and indirect adverse effects to these species and to the primary biological features of their designated critical habitat. As a result, affected species are likely to suffer reductions in viability from one or more of the a.i.s given the severity of expected changes in abundance and productivity associated with the proposed action. These adverse effects are expected to appreciably reduce the likelihood of both the survival and recovery of these listed species and reduce the conservation value of some of the species' designated critical habitat.

The RPA accounts for the following issues: (1) the action will result in exposure to other chemical stressors in addition to the a.i. that may increase the risk of the action to ESA-listed species, including unspecified inert ingredients, adjuvants, and tank mixes; (2) exposure to chemical mixtures containing the a.i.s and other chemical compounds may result in greater toxicity; and (3) exposure to other chemicals and physical stressors (*e.g.,* temperature) in the baseline habitat will likely intensify response to the a.i.s.

The action as implemented under the RPA will remove the likelihood of jeopardy and of destruction or adverse modification of critical habitat by reducing exposure of the stressors of the action. In the proposed RPA, NMFS does not attempt to ensure there is no take of ESA-listed species. NMFS concludes that take will likely occur, and has provided an incidental take statement exempting that take from the take prohibitions as long as the action is conducted in compliance with the terms and conditions of the incidental take statement. Avoiding take altogether would most likely entail canceling registration, or prohibiting all use in watersheds inhabited by listed species. The goal of the RPA is to reduce exposure to ensure that the action is not likely to jeopardize ESA-listed species or destroy or adversely modify critical habitat.

For each active ingredient, the elements of the RPA apply only to the range of the ESUs/DPSs where NMFS has determined that EPA cannot ensure that its registration of that a.i. avoids jeopardy or the destruction or adverse modification of critical habitat (Chapter 25). These elements rely upon recognized practices for reducing loading of pesticide products into aquatic habitats.

Overall, the RPA listed here focus on reducing exposure potential to listed species and their habitats by targeting risk reduction measures that effectively reduce drift and runoff. The RPA include pesticide use restrictions that shall be specified on Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) labels of all pesticide products containing the three active ingredients; this shall be accomplished by incorporating the required elements of the RPA into the "Directions for Use" section of the FIFRA labels or on EPA Endangered Species Protection

Program Bulletins that serve as enforceable extensions to these labels (https://www.epa.gov/endangered-species/endangered-species-protection-bulletins).

The RPA listed here also incorporates risk reduction measures for pesticide users that participate in conservation activities. These include: 1) installing/maintaining riparian systems alongside aquatic habitats, and 2) participation in a recognized pesticide stewardship plan. Pesticide users that take advantage of these activities receive full points for required risk reduction measures for drift and runoff/drainage.

Riparian areas occur alongside watercourses or water bodies and are typically distinct from surrounding lands due to their unique soil and vegetation characteristics that are influenced by the hydrologic conditions of the soil. Pesticides can move from treated agricultural and forested areas via spray drift and surface water runoff into the broader environment. Riparian areas filter runoff and intercept drift thereby reducing loading into off target water bodies. Generally, the use of riparian areas, coupled with low-drift application methods, substantially reduce drift deposition and runoff into sensitive aquatic habitats adjacent to pesticide use sites. Therefore, a functional riparian zone substantially reduces pesticide loading, potentially negating the need for no-spray buffers. The effectiveness in reducing pesticide loading depends on site-specific factors such as dimensions, type, and complexity of the riparian vegetation.

Pesticide stewardship plans[1], such as Salmon-Safe, work with landowners to create a management plan that reduces or eliminates use of pesticides thereby removing potential exposure to listed species and their habitats. Therefore, landowners that participate in such plans would receive full credit for required risk reduction measures.

26.1.1 Reasonable and Prudent Alternatives

Five distinct elements are required to ensure jeopardy is avoided and to ensure designated critical habitat is not destroyed or modified. These elements are:

1. Reduce pesticide loading for high risk use sites;
2. Limit the frequency of application to once per year for persistent pesticides i.e., chlorpyrifos;
3. Limit area of application for mosquito control;
4. Limit area of application for wide area use;
5. Employ an effectiveness monitoring plan.

Element 1 involves three options which EPA can implement through label revisions that would reduce pesticide loading in listed species aquatic habitats (Table 1). The first of these options changes the action by prohibiting the use of high risk uses within a species range and/or modifying labels based on actual usage. In the second option, EPA could require specific no application buffers and mandate a 6 meter vegetative filter strip for all high risk uses within the species range. The third option provides flexibility for pesticide users to select risk reduction measures using the point system approach described below. This option includes a variety of risk reduction measures including no-spray buffers, vegetative filter strips, spray drift reduction technologies, and participation in pesticide stewardship programs such as “Salmon-Safe”.

[1] NMFS approval of stewardship plan required to receive risk reduction credit

Table 1. RPA Elements

RPA Element	Description
Element 1	Reduce pesticide loading for all high risk use sites. Choose 1(a) or 1(b) or 1(c). 1(a) Remove label authorization for all high risk uses. If current usage on use sites effectively reduces exposure[2], modify labels to reflect current usage. 1(b) Modify labels to include standard buffers and vegetative filter strips: 300 meter no-spray buffer for all aerial applications; 150 meter buffer for all ground applications; 6 meter vegetative filter strip for all applications. 1(c) Point System. Implement a combination of risk reduction measures to reduce pesticide drift, runoff, and drainage.
Element 2	Limit the frequency of application to once per year for persistent pesticides e.g. chlorpyrifos.
Element 3	Restrict mosquito applications to residential and developed areas within species' range.
Element 4	Restrict wide area use to residential and developed areas with spot treatment only.
Element 5	EPA shall, in close coordination with NMFS Office of Protected Resources, develop and implement an effectiveness monitoring plan to ensure the RPA(s) selected is/are feasible, effective, and implemented.

26.1.2 Points System Overview: Element 1(c)

Pesticide end-users could also follow a simple point system to arrive at sufficient risk reduction measures. The points system is based on the European Union's Mitigating the Risks of Plant Protection Products in the Environment, referred to as MAgPIE (Alix et al. 2017). While the goal of MAgPIE was to develop a harmonized approach for risk management among EU countries, the approach achieves quantifiable reductions in pesticide loading while allowing maximum flexibility for the grower/applicator. It also rewards landowners who are already implementing reduction measures such as Best Management Practices (BMPs) that reduce loading and improve habitat for listed species.

Important aspects of the points approach:

- The pesticide applicator can choose from a list of risk reduction measures (e.g. Table 2) listed on EPA's Bulletins Live website.
- Each risk reduction measure on the list has a point value based on its effectiveness at reducing loading from drift and runoff/drainage.

[2]Requires NMFS concurrence that EPA-proposed alternative based on usage information effectively reduces exposure

- The applicator can choose which risk reduction measures to implement as long as the required number of points are achieved for each exposure pathway (drift and runoff/drainage).
- The point system is only required for high risk uses. High risk uses are those which received a high rating for effect of exposure and a high or medium rating for likelihood of exposure as presented in the Effects of the Proposed Action.

Risk reduction measures and associated points are presented below in Table 2, Table 3, and Table 4. The RPA and RPM for each of the three pesticides apply to applications on high risk use sites within 300 meters adjacent to, or that drain to listed species aquatic habitats for which jeopardy or adverse modification of designated critical habitat was determined.

Table 2. Chlorpyrifos Risk Reduction Measures and Associated Points

Drift Measures	Estimated % reduction in loading	Points	Runoff/drainage Measures	Estimated % reduction in loading	Points
No Spray Drift Buffers :			No Spray Buffer ≥300 meters to listed species habitat or water that drains to habitat	99	80
Ground boom[1] /chemigation buffer:					
10 meters	25	5			
20 meters	60	40			
100 meters	90	70			
200 meters	95	75			
300 meters	99	80			
Air blast buffer[2]:					
20 meters	40	20			
100 meters	99	80			
Aerial buffer[3]:					
100 meters	60	40			
300 meters	99	80			
Spray Drift Reduction Technology[4] (nozzles, etc.):			Vegetated filter strip[5]:		
			5 meters	40	20
Category one	25-50	20	10 meters	65	45
Category two	50-75	45	20 meters	80	60
Category three	75-90	65			
Category four	>90	75	Inter row	50	30
Granular treatment	99	80	Bunds[5]:		
			Edge of field	40	20
			In-field	50	30
Spot Applications <0.1 A[6]	99	80	Spot Applications <0.1A[6]	99	80
			Vegetated ditches[5]	50	30
Riparian plantings[7]	27-36	10	No-till or reduced tillage[5]	50	30
			Retention pond[5]	75	55
Participation in recognized stewardship program	99	80	Participation in recognized stewardship program	99	80
Functional riparian system alongside water ways, > 10 meters wide	99	80	Functional riparian system alongside water ways, > 10 meters wide	99	80

[1] AgDrift Tier 1 Ground Boom – point deposition estimates compared to 25 foot ground application buffer: low boom, very fine to fine distribution, 50th percentile distribution.
[2] AgDrift Tier 1 Orchard Airblast - point deposition estimates for sparse orchard compared to 50 foot airblast application buffer.
[3] AgDrift Tier 1 Aerial – point deposition estimates compared to 150 foot aerial application buffer.
[4] EPA may have not verified any products yet (https://www.epa.gov/reducing-pesticide-drift/epa-verified-and-rated-drift-reduction-technologies).
[5] MAgPIE. 2017
[6] Assumes median field size of 0.278 km^2 (Yan and Roy 2016)
[7] Washington State Department of Agriculture riparian vegetation pilot study (2015)

Table 3. Diazinon Risk Reduction Measures and Associated Points

Drift Measures	Estimated % reduction in loading	Points	Runoff/drainage Measures	Estimated % reduction in loading	Points
No Spray Drift Buffers :			No Spray Buffer ≥300 meters to listed species habitat or water that drains to habitat	99	80
Ground boom/chemigation buffer:					
10 meters	90	70			
Air blast buffer:					
10 meters	80	60			
20 meters	95	75			
Aerial buffer:					
10 meters	55	35			
20 meters	70	50			
100 meters	95	75			
Spray Drift Reduction Technology (nozzles, etc.):			Vegetated filter strip:		
Category one			5 meters	40	20
Category two	25-50	20	10 meters	65	45
Category three	50-75	45	20 meters	80	60
Category four	75-90	65			
	>90	75	Inter row	50	30
Granular treatment	99	80	Bunds:		
			Edge of field	40	20
			In-field	50	30
Spot Applications <0.1 A	99	80	Spot Applications <0.1A	99	80
			Vegetated ditches	50	30
Riparian plantings	27-36	10	No-till or reduced tillage	50	30
			Retention pond	75	55
Participation in recognized stewardship program	99	80	Participation in recognized stewardship program	99	80
Functional riparian system alongside water ways, > 10 meters wide	99	80	Functional riparian system alongside water ways, > 10 meters wide	99	80

[1] AgDrift Tier 1 Ground Boom – point deposition estimates compared to field edge (1 m buffer): low boom, very fine to fine distribution, 50th percentile distribution.

[2] AgDrift Tier 1 Orchard Airblast - point deposition estimates for sparse orchard compared to field edge (1m buffer).

[3] AgDrift Tier 1 Aerial – point deposition estimates compared to field edge (1 meter buffer)

[4] EPA may have not verified any products yet (https://www.epa.gov/reducing-pesticide-drift/epa-verified-and-rated-drift-reduction-technologies).

[5] MAgPIE 2017

[6] Assumes median field size of 0.278 km² (Yan and Roy 2016)

[7] Washington State Department of Agriculture riparian vegetation pilot study (2015)

Table 4. Malathion Risk Reduction Measures and Associated Points

Drift Measures	Estimated % reduction in loading	Points	Runoff/drainage Measures	Estimated % reduction in loading	Points
No Spray Drift Buffers :			No Spray Buffer ≥300 meters to listed species habitat or water that drains to habitat	99	80
Ground boom[1] /chemigation buffer:					
10 meters	90	70			
Air blast buffer[2]:					
10 meters	80	60			
20 meters	95	75			
Aerial buffer[3]:					
20 meters	35	15			
100 meters	85	65			
150 meters	90	70			
Spray Drift Reduction Technology[4](nozzles, etc.):			Vegetated filter strip[5]:		
			5 meters	40	20
			10 meters	65	45
			20 meters	80	60
Category one	25-50	20			
Category two	50-75	45			
Category three	75-90	65	Inter row	50	30
Category four	>90	75			
Granular treatment	99	80	Bunds[5]:		
			Edge of field	40	20
			In-field	50	30
Spot Applications <0.1 A[6]	99	80	Spot Applications <0.1A[6]	99	80
			Vegetated ditches[5]	50	30
Riparian plantings[7]	27-36	10	No-till or reduced tillage[5]	50	30
			Retention pond[5]	75	55
Participation in recognized stewardship program	99	80	Participation in recognized stewardship program	99	80
Functional riparian system alongside water ways, > 10 meters wide	99	80	Functional riparian system alongside water ways, > 10 meters wide	99	80

[1] AgDrift Tier 1 Ground Boom – point deposition estimates compared to field edge (1 m buffer): low boom, very fine to fine distribution, 50th percentile distribution.

[2] AgDrift Tier 1 Orchard Airblast - point deposition estimates for sparse orchard compared to field edge (1m buffer).

[3] AgDrift Tier 1 Aerial – Fine to medium distribution, point deposition estimates compared to 25 foot non-ULV aerial buffer.

[4] Range corresponds with EPA star program (https://www.epa.gov/reducing-pesticide-drift/epa-verified-and-rated-drift-reduction-technologies).

[5] MAgPIE 2017

[6] Assumes median field size of 0.278 km^2 (Yan and Roy 2016)

[7] Washington State Department of Agriculture riparian vegetation pilot study (2015)

26.2 Reasonable and Prudent Alternatives for Each Species and Pesticide

This section describes chemical-specific RPA elements for each of the ESA-listed species for which jeopardy or adverse modification of designated critical habitats was determined.

26.2.1 Chlorpyrifos RPA

- Reduce pesticide loading for all high risk use sites.
    - 1(a) Remove label authorization for all high risk uses. If current usage on use sites effectively reduces exposure, modify labels to reflect current usage.
    - 1(b) Modify labels to include 300 meter no-spray buffer for all aerial applications; 150 meter buffer for all ground applications; 6 meter vegetative filter strip for all applications.
    - 1(c) Point System. Implement a combination of risk reduction measures to reduce pesticide drift and runoff (Table 5).
- Limit the frequency of application to once per year.
- Restrict mosquito applications to residential and developed areas within species' range.
- Restrict wide area use to residential and developed areas with spot treatment only.
- EPA shall, in close coordination with NMFS Office of Protected Resources, develop and implement an effectiveness monitoring plan to ensure the elements selected are feasible, effective, and implemented.

Table 5. High risk uses for chlorpyrifos and risk reduction points required for drift and runoff/drainage

Chlorpyrifos	**Risk Reduction Options for High Risk Uses**		
Species	**Remove label authorization for all high risk uses**	**No-spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
Chum salmon , Columbia River Evolutionarily Significant Unit (ESU) (T)	Right of Way Pasture Developed	Right of Way Pasture Developed	80 drift 80 runoff
Chum salmon, Hood Canal summer-run ESU (T)	Managed Forest Right of Way Pasture Developed	Managed Forest Right of Way Pasture Developed	80 drift 80 runoff
Chinook salmon, California coastal ESU (T)	Pasture Managed Forest Right of Way Developed Orchards and Vineyards	Pasture Managed Forest Right of Way Developed Orchards and Vineyards	80 drift 80 runoff
Chinook salmon, Central Valley spring-run ESU (T)	Pasture Orchards and Vineyards Right of Way Developed	Pasture Orchards and Vineyards Right of Way Developed	80 drift 80 runoff

Chlorpyrifos	Risk Reduction Options for High Risk Uses		
Species	**Remove label authorization for all high risk uses**	**No-spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
	Other Crops Corn Managed Forest Vegetables and Ground Fruit Wheat Other Grains Cotton Other Row Crops	Other Crops Corn Managed Forest Vegetables and Ground Fruit Wheat Other Grains Cotton Other Row Crops	
Chinook salmon, Lower Columbia River ESU (T)	Managed Forest Right of Way Pasture Developed Christmas Trees Orchards and Vineyards Other Crops Vegetables and Ground Fruit Corn Wheat Other Grains	Managed Forest Right of Way Pasture Developed Christmas Trees Orchards and Vineyards Other Crops Vegetables and Ground Fruit Corn Wheat Other Grains	80 drift 80 runoff
Chinook salmon, Puget Sound ESU (T)	Managed Forest Right of Was Developed Pasture Vegetables and Ground Fruit Corn Other Grains Wheat	Managed Forest Right of Was Developed Pasture Vegetables and Ground Fruit Corn Other Grains Wheat	80 drift 80 runoff
Chinook salmon, Sacramento River winter-run ESU (E)	Pasture Right of Way Developed Orchards and Vineyards Other Crops Corn Managed Forest Vegetables and Ground Fruit Wheat Other Grains Other Row Crops	Pasture Right of Way Developed Orchards and Vineyards Other Crops Corn Managed Forest Vegetables and Ground Fruit Wheat Other Grains Other Row Crops	80 drift 80 runoff

Chlorpyrifos	Risk Reduction Options for High Risk Uses		
Species	**Remove label authorization for all high risk uses**	**No-spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
Chinook salmon, Snake River fall-run ESU (T)	Pasture Managed Forest Right of Way Wheat Developed Other Crops Vegetables and Ground Fruit orchards and Vineyards Corn Other Grains	Pasture Managed Forest Right of Way Wheat Developed Other Crops Vegetables and Ground Fruit orchards and Vineyards Corn Other Grains	80 drift 80 runoff
Chinook salmon, Snake River spring/summer run ESU (T)	Managed Forest Pastures Wheat Right of Way Other Crops Developed Vegetables and Ground Orchards and Vineyards Corn	Managed Forest Pastures Wheat Right of Way Other Crops Developed Vegetables and Ground Orchards and Vineyards Corn	80 drift 80 runoff
Chinook salmon, Upper Columbia River spring-run ESU (E)	Managed Forest Pasture Right of Way Developed Orchards and Vineyards Wheat Other Crops Vegetables and Ground Fruit Corn	Managed Forest Pasture Right of Way Developed Orchards and Vineyards Wheat Other Crops Vegetables and Ground Fruit Corn	80 drift 80 runoff
Chinook salmon, Upper Willamette River ESU (T)	Managed Forest Pasture Right of Way Developed Other Crops Vegetables and Ground fruit Wheat Christmas Trees Orchards and Vineyards Corn Other grains Other Row Crops	Managed Forest Pasture Right of Way Developed Other Crops Vegetables and Ground fruit Wheat Christmas Trees Orchards and Vineyards Corn Other grains Other Row Crops	80 drift 80 runoff

Chlorpyrifos	Risk Reduction Options for High Risk Uses		
Species	**Remove label authorization for all high risk uses**	**No-spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
Coho salmon, Central California coast ESU (E)	Right of Way Pasture Developed Managed Forest Orchards and Vineyards	Right of Way Pasture Developed Managed Forest Orchards and Vineyards	80 drift 80 runoff
Coho salmon, Lower Columbia River ESU (E)	Managed Forest Right of Way Pasture Developed	Managed Forest Right of Way Pasture Developed	80 drift 80 runoff
Coho salmon, Oregon coast ESU (T)	Managed Forest Pasture Right of Way Developed	Managed Forest Pasture Right of Way Developed	80 drift 80 runoff
Coho salmon, S. Oregon and N. Calif coasts ESU (T)	Managed Forest Pasture Right of Way Developed Other Crops	Managed Forest Pasture Right of Way Developed Other Crops	80 drift 80 runoff
Sockeye, Ozette Lake ESU (T)	Managed Forest Right of Way Pasture	Managed Forest Right of Way Pasture	80 drift 80 runoff
Sockeye, Snake River ESU (E)	Managed Forest Pasture Right of Way	Managed Forest Pasture Right of Way	80 drift 80 runoff
Steelhead, California Central Valley ESU (T)	Pasture Orchards and Vineyards Right of Way Developed Other Crops Managed Forest Corn Vegetables and Ground Fruit What Other Grains Cotton Other Row Crops	Pasture Orchards and Vineyards Right of Way Developed Other Crops Managed Forest Corn Vegetables and Ground Fruit What Other Grains Cotton Other Row Crops	80 drift 80 runoff
Steelhead, Central California coast ESU (T)	Right of Way Pasture Developed Managed Forest Orchards and Vineyards Other grains Other Crops	Right of Way Pasture Developed Managed Forest Orchards and Vineyards Other grains Other Crops	80 drift 80 runoff

Chlorpyrifos	Risk Reduction Options for High Risk Uses		
Species	**Remove label authorization for all high risk uses**	**No-spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
	Wheat	Wheat	
Steelhead, Lower Columbia River ESU (T)	Managed Forest Right of Way Pasture Developed Orchards and Vineyards Other Crops Vegetables and Ground Fruit Corn Wheat Other Grains	Managed Forest Right of Way Pasture Developed Orchards and Vineyards Other Crops Vegetables and Ground Fruit Corn Wheat Other Grains	80 drift 80 runoff
Steelhead, Middle Columbia River ESU (T)	Managed Forest Pasture Right of Way Wheat Other Crops Developed Orchards and Vineyards Vegetables and Ground Fruit Corn Other Row Crops	Managed Forest Pasture Right of Way Wheat Other Crops Developed Orchards and Vineyards Vegetables and Ground Fruit Corn Other Row Crops	80 drift 80 runoff
Steelhead, Northern California ESU (T)	Managed Forest Pasture Right of Way Developed Golf Courses Orchards and Vineyards	Managed Forest Pasture Right of Way Developed Golf Courses Orchards and Vineyards	80 drift 80 runoff
Steelhead, Puget Sound ESU (T)	Managed Forests Right of Way Developed Pasture	Managed Forests Right of Way Developed Pasture	80 drift 80 runoff
Steelhead, Snake River Basin ESU (T)	Managed Forest Pasture Wheat Right of Way Other Crops Developed Vegetables and Ground Fruit Other Grains Orchards and Vineyards Corn	Managed Forest Pasture Wheat Right of Way Other Crops Developed Vegetables and Ground Fruit Other Grains Orchards and Vineyards Corn	80 drift 80 runoff

Chlorpyrifos	Risk Reduction Options for High Risk Uses		
Species	**Remove label authorization for all high risk uses**	**No-spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
Steelhead, South-Central California coast ESU (T)	Pasture Right of Way Orchards and Vineyards Developed Managed Forest Other Crops Vegetables and Ground Fruit Other Grains Wheat Corn Cotton	Pasture Right of Way Orchards and Vineyards Developed Managed Forest Other Crops Vegetables and Ground Fruit Other Grains Wheat Corn Cotton	80 drift 80 runoff
Steelhead, Southern California ESU (E)	Right of Way Developed Pasture Managed Forest Golf Courses Orchards and Vineyards Vegetables and Ground Fruit Other Crops Other Grains Cotton Corn	Right of Way Developed Pasture Managed Forest Golf Courses Orchards and Vineyards Vegetables and Ground Fruit Other Crops Other Grains Cotton Corn	80 drift 80 runoff
Steelhead, Upper Columbia River ESU (T)	Managed Forest Pasture Right of Way Developed Orchards and Vineyards Wheat Other Crops Vegetables and Ground Fruit Corn	Managed Forest Pasture Right of Way Developed Orchards and Vineyards Wheat Other Crops Vegetables and Ground Fruit Corn	80 drift 80 runoff
Steelhead, Upper Willamette River ESU (T)	Managed Forest Pasture Right of Way Developed Other Crops Christmas Trees Wheat Vegetables and Ground Fruit Orchards and Vineyards Corn	Managed Forest Pasture Right of Way Developed Other Crops Christmas Trees Wheat Vegetables and Ground Fruit Orchards and Vineyards	80 drift 80 runoff

Chlorpyrifos	Risk Reduction Options for High Risk Uses		
Species	**Remove label authorization for all high risk uses**	**No-spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
	Other Grains Golf Courses Other Row Crops	Corn Other Grains Golf Courses Other Row Crops	
Eulachon, Pacific smelt, Southern Distinct Population Segment (DPS) (T)	Managed Forest Right of Way Pasture Developed	Managed Forest Right of Way Pasture Developed	80 drift 80 runoff
Green sturgeon, Southern DPS (T)	Right of Way Pasture Managed Forest Developed Orchards and Vineyards Other Crops Corn Vegetables and Ground Fruit Wheat Other Grains Golf Courses Other Row Crops	Right of Way Pasture Managed Forest Developed Orchards and Vineyards Other Crops Corn Vegetables and Ground Fruit Wheat Other Grains Golf Courses Other Row Crops	80 drift 80 runoff
Shortnose sturgeon (E)	Managed Forest Right of Way Developed Pasture Soybean Corn	Managed Forest Right of Way Developed Pasture Soybean Corn	80 drift 80 runoff
Atlantic sturgeon, Carolina DPS (E)	Managed Forest Right of Way Soybeans Pasture Corn Developed Cotton Other Crops Wheat	Managed Forest Right of Way Soybeans Pasture Corn Developed Cotton Other Crops Wheat	80 drift 80 runoff
Atlantic sturgeon, Chesapeake Bay DPS (E)	Right of Way Managed Forest Soybean Developed Corn Pasture Golf Courses Cotton	Right of Way Managed Forest Soybean Developed Corn Pasture Golf Courses Cotton	80 drift 80 runoff

Chlorpyrifos	Risk Reduction Options for High Risk Uses		
Species	**Remove label authorization for all high risk uses**	**No-spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
	Wheat	Wheat	
Atlantic sturgeon, Gulf of Maine DPS (T)	Right of Way Developed Pasture Managed forest	Right of Way Developed Pasture Managed forest	80 drift 80 runoff
Atlantic sturgeon, New York Bight DPS (E)	Right of Way Developed Managed Forest Pasture Corn Soybeans Other Crops Golf Courses Vegetables and Ground Fruit Wheat Orchards and Vineyards	Right of Way Developed Managed Forest Pasture Corn Soybeans Other Crops Golf Courses Vegetables and Ground Fruit Wheat Orchards and Vineyards	80 drift 80 runoff
Atlantic sturgeon, South Atlantic DPS (E)	Managed Forest Pasture Right of Way Developed Cotton Other Crops Corn Other Row Crops Soybeans Orchards and Vineyards Wheat	Managed Forest Pasture Right of Way Developed Cotton Other Crops Corn Other Row Crops Soybeans Orchards and Vineyards Wheat	80 drift 80 runoff
Smalltooth sawfish, U.S. DPS.*	Managed Forest Right of Way Pasture Developed Golf Course Orchards	Managed Forest Right of Way Pasture Developed Golf Course Orchards	80 drift 80 runoff
Killer whale, Southern Resident DPS	Implementation of RPAs for all west coast Chinook ESUs		

For smalltooth sawfish, risk reduction measures are only required at use sites within the species nursery areas, as opposed to within the entire species range.

26.2.2 Diazinon RPA

- Reduce pesticide loading for all high risk use sites.
    - 1(a) Remove label authorization for all high risk uses. If current usage on use sites effectively reduces exposure, modify labels to reflect current usage.
    - 1(b) Modify labels to include 300 meter no-spray buffer for all aerial applications; 150 meter buffer for all ground applications; 6 meter vegetative filter strip for all applications.
    - 1(c) Point System. Implement a combination of risk reduction measures to reduce pesticide drift and runoff (Table 6)
- EPA shall, in close coordination with NMFS Office of Protected Resources, develop and implement an effectiveness monitoring plan to ensure the RPA(s) selected is/are feasible, effective, and implemented.

Table 6. High risk uses for diazinon and risk reduction points required for drift and runoff

Diazinon	**Risk Reduction Options for High Risk Uses**		
Species	**Remove label authorization for all high risk uses**	**No-spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
Chinook salmon, Central Valley spring-run ESU (T)	Orchards and Vineyards Vegetables and Ground Fruit	Orchards and Vineyards Vegetables and Ground Fruit	80 drift 80 runoff
Chinook salmon, Lower Columbia River ESU (T)	Orchards and Vineyards Vegetables and Ground Fruit	Orchards and Vineyards Vegetables and Ground Fruit	80 drift 80 runoff
Chinook salmon, Puget Sound ESU (T)	Vegetables and Ground Fruit	Vegetables and Ground Fruit	80 drift 80 runoff
Chinook salmon, Sacramento River winter-run ESU (E)	Orchards and Vineyards Vegetables and Ground Fruit	Orchards and Vineyards Vegetables and Ground Fruit	80 drift 80 runoff
Chinook salmon, Snake River fall-run ESU (T)	Vegetables and Ground Fruit Orchards and Vineyards	Vegetables and Ground Fruit Orchards and Vineyards	80 drift 80 runoff
Chinook salmon, Snake River spring/summer run ESU (T)	Vegetables and Ground Fruit Orchards and Vineyards	Vegetables and Ground Fruit Orchards and Vineyards	80 drift 80 runoff
Chinook salmon, Upper Columbia River spring-run ESU (E)	Orchards and Vineyards Vegetables and Ground Fruit	Orchards and Vineyards Vegetables and Ground Fruit	80 drift 80 runoff
Chinook salmon, Upper Willamette River ESU (T)	Vegetables and Ground Fruit Orchards and Vineyards	Vegetables and Ground Fruit Orchards and Vineyards	80 drift 80 runoff
Coho salmon, Central California coast ESU (E)	Orchards and Vineyards	Orchards and Vineyards	80 drift 80 runoff

Diazinon	Risk Reduction Options for High Risk Uses		
Species	**Remove label authorization for all high risk uses**	**No-spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
Sockeye, Snake River ESU (E)	Vegetables & Ground Fruit Orchards and Vineyards	Vegetables & Ground Fruit Orchards and Vineyards	80 drift 80 runoff
Steelhead, California Central Valley ESU (T)	Orchards and Vineyards Vegetables and Ground Fruit	Orchards and Vineyards Vegetables and Ground Fruit	80 drift 80 runoff
Steelhead, Central California coast ESU (T)	Orchards and Vineyards	Orchards and Vineyards	80 drift 80 runoff
Steelhead, Lower Columbia River ESU (T)	Orchards and Vineyards Vegetables and Ground Fruit	Orchards and Vineyards Vegetables and Ground Fruit	80 drift 80 runoff
Steelhead, Middle Columbia River ESU (T)	Orchards and Vineyards Vegetables and Ground Fruit	Orchards and Vineyards Vegetables and Ground Fruit	80 drift 80 runoff
Steelhead, Northern California ESU (T)	Orchards and Vineyards	Orchards and Vineyards	80 drift 80 runoff
Steelhead, Snake River Basin ESU (T)	Vegetables and Ground Fruit Orchards and Vineyards	Vegetables and Ground Fruit Orchards and Vineyards	80 drift 80 runoff
Steelhead, South-Central California coast ESU (T)	Orchards and Vineyards Vegetables and Ground Fruit	Orchards and Vineyards Vegetables and Ground Fruit	80 drift 80 runoff
Steelhead, Southern California ESU (E)	Orchards and Vineyards Vegetables and Ground Fruit	Orchards and Vineyards Vegetables and Ground Fruit	80 drift 80 runoff
Steelhead, Upper Columbia River ESU (T)	Orchards and Vineyards Vegetables and Ground Fruit	Orchards and Vineyards Vegetables and Ground Fruit	80 drift 80 runoff
Steelhead, Upper Willamette River ESU (T)	Vegetables and Ground Fruit Orchards and Vineyards	Vegetables and Ground Fruit Orchards and Vineyards	80 drift 80 runoff
Green sturgeon, Southern DPS (T)	Orchards and Vineyards Vegetables and Ground Fruit	Orchards and Vineyards Vegetables and Ground Fruit	80 drift 80 runoff
Atlantic sturgeon, New York Bight DPS (E)	Vegetables and Ground Fruit Orchards and Vineyards	Vegetables and Ground Fruit Orchards and Vineyards	70 drift 70 runoff
Atlantic sturgeon, South Atlantic DPS (E)	Orchards and Vineyards	Orchards and Vineyards	70 drift 70 runoff
Killer whale, Southern Resident DPS	Implementation of RPAs for all west coast Chinook ESUs		

26.2.3 Malathion RPA

- Reduce pesticide loading for all high risk use sites.
    - 1(a) Remove label authorization for all high risk uses. If current usage on use sites effectively reduces exposure, modify labels to reflect current usage.
    - 1(b) Modify labels to include 300 meter no-spray buffer for all aerial applications; 150 meter buffer for all ground applications; 6 meter vegetative filter strip for all applications.
    - 1(c) Point System. Implement a combination of risk reduction measures to reduce pesticide drift and runoff (Table 7).
- Restrict mosquito applications to residential and developed areas within species' range.
- EPA shall, in close coordination with NMFS Office of Protected Resources, develop and implement an effectiveness monitoring plan to ensure the RPA(s) selected is/are feasible, effective, and implemented.

Table 7. High risk uses for malathion and risk reduction points required for drift and runoff

Malathion	**Risk Reduction Options for High Risk Uses**		
Species	**Remove label authorization for all high risk uses**	**No-Spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
Chum salmon , Columbia River ESU (T)	Pasture Developed	Pasture Developed	80 drift 80 runoff
Chum salmon, Hood Canal summer-run ESU (T)	Pasture Developed	Pasture Developed	80 drift 80 runoff
Chinook salmon, California coastal ESU (T)	Pasture Developed Orchards and Vineyards	Pasture Developed Orchards and Vineyards	80 drift 80 runoff
Chinook salmon, Central Valley spring-run ESU (T)	Pasture Orchards and Vineyards Developed Other Crops Corn Vegetables and Ground fruits Wheat Other Grains Cotton Other Row Crops	Pasture Orchards and Vineyards Developed Other Crops Corn Vegetables and Ground fruits Wheat Other Grains Cotton Other Row Crops	80 drift 80 runoff
Chinook salmon, Lower Columbia River ESU (T)	Pasture Developed Christmas Trees Orchards and Vineyards Other Crops Vegetables and Ground fruit	Pasture Developed Christmas Trees Orchards and Vineyards Other Crops Vegetables and Ground fruit	80 drift 80 runoff

Malathion	Risk Reduction Options for High Risk Uses		
Species	**Remove label authorization for all high risk uses**	**No-Spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
	Corn Nurseries Other Grains	Corn Nurseries Other Grains	
Chinook salmon, Puget Sound ESU (T)	Developed Pasture Vegetables and Ground Fruit Corn Other Grains Wheat	Developed Pasture Vegetables and Ground Fruit Corn Other Grains Wheat	80 drift 80 runoff
Chinook salmon, Sacramento River winter-run ESU (E)	Pasture Developed Orchards and Vineyards Other Crops Corn Vegetables and Ground Fruit Wheat Other Grains Other Row Crops	Pasture Developed Orchards and Vineyards Other Crops Corn Vegetables and Ground Fruit Wheat Other Grains Other Row Crops	80 drift 80 runoff
Chinook salmon, Snake River fall-run ESU (T)	Pasture Wheat Developed Other Crops Vegetables and Ground fruit Orchards and Vineyards Corn Other Grains	Pasture Wheat Developed Other Crops Vegetables and Ground fruit Orchards and Vineyards Corn Other Grains	80 drift 80 runoff
Chinook salmon, Snake River spring/summer run ESU (T)	Pasture Wheat Other Crops Developed Vegetables and Ground fruit Orchards and Vineyards Corn	Pasture Wheat Other Crops Developed Vegetables and Ground fruit Orchards and Vineyards Corn	80 drift 80 runoff
Chinook salmon, Upper Columbia River spring-run ESU (E)	Pasture Developed Orchards and Vineyards Wheat Other Crops Vegetables and Ground Fruit Corn	Pasture Developed Orchards and Vineyards Wheat Other Crops Vegetables and Ground Fruit Corn	80 drift 80 runoff
Chinook salmon, Upper Willamette River ESU (T)	Pasture Developed Other Crops Vegetables and Ground Fruit	Pasture Developed Other Crops Vegetables and Ground Fruit	80 drift 80 runoff

Malathion	Risk Reduction Options for High Risk Uses		
Species	**Remove label authorization for all high risk uses**	**No-Spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
	Wheat Christmas Trees Orchards and Vineyards Corn Other Grains Other Row Crops	Wheat Christmas Trees Orchards and Vineyards Corn Other Grains Other Row Crops	
Coho salmon, Central California coast ESU (E)	Pasture Developed Orchards and Vineyards	Pasture Developed Orchards and Vineyards	80 drift 80 runoff
Coho salmon, Lower Columbia River ESU (E)	Pasture Developed	Pasture Developed	80 drift 80 runoff
Coho salmon, Oregon coast ESU (T)	Pasture Developed	Pasture Developed	80 drift 80 runoff
Coho salmon, S. Oregon and N. Calif coasts ESU (T)	Pasture Developed Other Crops	Pasture Developed Other Crops	80 drift 80 runoff
Sockeye, Ozette Lake ESU (T)	Pasture	Pasture	80 drift 80 runoff
Sockeye, Snake River ESU (E)	Pasture	Pasture	80 drift 80 runoff
Steelhead, California Central Valley ESU (T)	Pasture Orchards and Vineyards Developed Other Crops Corn Vegetables and Ground Fruit Wheat Other Grains Cotton Other Row Crops	Pasture Orchards and Vineyards Developed Other Crops Corn Vegetables and Ground Fruit Wheat Other Grains Cotton Other Row Crops	80 drift 80 runoff
Steelhead, Central California coast ESU (T)	Pasture Developed Orchards and Vineyards Other Grains Other Crops Wheat	Pasture Developed Orchards and Vineyards Other Grains Other Crops Wheat	80 drift 80 runoff
Steelhead, Lower Columbia River ESU (T)	Pasture Developed Christmas Trees Orchards and Vineyards Other Crops Vegetables and Ground Fruit Corn	Pasture Developed Christmas Trees Orchards and Vineyards Other Crops Vegetables and Ground Fruit Corn	80 drift 80 runoff

Malathion	Risk Reduction Options for High Risk Uses		
Species	**Remove label authorization for all high risk uses**	**No-Spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
	Wheat Other Grains	Wheat Other Grains	
Steelhead, Middle Columbia River ESU (T)	Pasture Wheat Other Crops Developed Orchards and Vineyards Vegetables and Ground Fruit Corn Other Row Crops	Pasture Wheat Other Crops Developed Orchards and Vineyards Vegetables and Ground Fruit Corn Other Row Crops	80 drift 80 runoff
Steelhead, Northern California ESU (T)	Pasture Developed Orchards and Vineyards	Pasture Developed Orchards and Vineyards	80 drift 80 runoff
Steelhead, Puget Sound ESU (T)	Developed Pasture	Developed Pasture	80 drift 80 runoff
Steelhead, Snake River Basin ESU (T)	Pasture Wheat Other Crops Developed Vegetables and Ground Fruit Other Grains Orchards and Vineyards Corn	Pasture Wheat Other Crops Developed Vegetables and Ground Fruit Other Grains Orchards and Vineyards Corn	80 drift 80 runoff
Steelhead, South-Central California coast ESU (T)	Pasture Orchards and Vineyards Developed Other Crops Vegetables and Ground Fruit Other Grains Wheat Corn Cotton	Pasture Orchards and Vineyards Developed Other Crops Vegetables and Ground Fruit Other Grains Wheat Corn Cotton	80 drift 80 runoff
Steelhead, Southern California ESU (E)	Developed Pasture Orchards and Vineyards Vegetables and Ground Fruit Cotton Corn	Developed Pasture Orchards and Vineyards Vegetables and Ground Fruit Cotton Corn	80 drift 80 runoff
Steelhead, Upper Columbia River ESU (T)	Pasture Developed Orchards and Vineyards Wheat Other Crops Vegetables and Ground fruit	Pasture Developed Orchards and Vineyards Wheat Other Crops Vegetables and Ground fruit	80 drift 80 runoff

Malathion	Risk Reduction Options for High Risk Uses		
Species	**Remove label authorization for all high risk uses**	**No-Spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
	Corn	Corn	
Steelhead, Upper Willamette River ESU (T)	Pasture Developed Other Crops Christmas Trees Wheat Vegetables and Ground Fruit Orchards and Vineyards Corn Other Grains Other Row Crops	Pasture Developed Other Crops Christmas Trees Wheat Vegetables and Ground Fruit Orchards and Vineyards Corn Other Grains Other Row Crops	80 drift 80 runoff
Eulachon, Pacific smelt, Southern DPS (T)	Pasture Developed	Pasture Developed	80 drift 80 runoff
Green sturgeon, Southern DPS (T)	Pasture Developed Orchards and Vineyards Other Crops Corn Vegetables and Ground Fruit Wheat Other Grains Other Row Crops	Pasture Developed Orchards and Vineyards Other Crops Corn Vegetables and Ground Fruit Wheat Other Grains Other Row Crops	70 drift 70 runoff
Shortnose sturgeon (E)	Developed Pasture Corn	Developed Pasture Corn	70 drift 70 runoff
Atlantic sturgeon, Carolina DPS (E)	Pasture Corn Developed Cotton Other Crops Wheat	Pasture Corn Developed Cotton Other Crops Wheat	70 drift 70 runoff
Atlantic sturgeon, Chesapeake Bay DPS (E)	Developed Corn Pasture Cotton Wheat	Developed Corn Pasture Cotton Wheat	70 drift 70 runoff
Atlantic sturgeon, Gulf of Maine DPS (T)	Developed Pasture	Developed Pasture	70 drift 70 runoff
Atlantic sturgeon, New York Bight DPS (E)	Developed Pasture Corn Other Crops Vegetables and Ground fruit	Developed Pasture Corn Other Crops Vegetables and Ground fruit	70 drift 70 runoff

Malathion	Risk Reduction Options for High Risk Uses		
Species	**Remove label authorization for all high risk uses**	**No-Spray Buffer: 300m aerial application, 150m ground application; and 6m vegetative filter strip**	**Required Points: Drift Runoff/drainage**
	Wheat Orchards and Vineyards	Wheat Orchards and Vineyards	
Atlantic sturgeon, South Atlantic DPS (E)	Pasture Developed Cotton Other Crops Corn Other Row Crops Orchards and Vineyards Wheat	Pasture Developed Cotton Other Crops Corn Other Row Crops Orchards and Vineyards Wheat	70 drift 70 runoff
Smalltooth sawfish, U.S. DPS*	Developed Pasture Orchards and Vineyards	Developed Pasture Orchards and Vineyards	80 drift 80 runoff
Killer whale, Southern Resident DPS	Implementation of RPAs for all west coast Chinook ESUs		
For smalltooth sawfish, risk reduction measures are only required at use sites within the species nursery areas, as opposed to within the entire species range.			

26.3 RPM Introduction

Section 7(b)(4) of the ESA requires that when a proposed agency action is found to be consistent with section 7(a)(2) of the ESA, either as proposed by the action agency or modified by a RPA, and the proposed action may incidentally take individuals of ESA-listed species, NMFS will issue a statement that specifies the impact of any incidental taking of endangered or threatened species ("incidental take statement" or "ITS"). To minimize such impacts, NMFS provides reasonable and prudent measures "RPM", and terms and conditions to implement the RPM. Action agency compliance with the terms and conditions provides an exemption from the prohibitions against "take" of listed species. NMFS believes the RPM and the implementing terms and conditions described below are necessary and appropriate to minimize the impacts of incidental take on threatened and endangered species. The measures described below are nondiscretionary, and must be undertaken by the U.S. Environmental Protection Agency so that they become binding conditions for the exemption in section 7(o)(2) to apply. Section 7(b)(4) of the ESA requires that when a proposed agency action is found to be consistent with section 7(a)(2) of the ESA and the proposed action may incidentally take individuals of ESA-listed species, NMFS will issue a statement that specifies the impact of any incidental taking of endangered or threatened species. To minimize such impacts, reasonable and prudent measures, and term and conditions to implement the measures, must be provided. Only incidental take resulting from the agency actions and any specified reasonable and prudent measures and terms and conditions identified in the incidental take statement are exempt from the taking prohibition of section 9(a), pursuant to section 7(o) of the ESA.

Reasonable and prudent measures (RPM)

"Reasonable and prudent measures" are nondiscretionary measures to minimize the amount or extent of incidental take (50 C.F.R. §402.02). The reasonable and prudent measures described below are necessary and appropriate to minimize the impacts of incidental take on threatened and endangered species:

- RPM 1. Revise all chlorpyrifos, diazinon, and malathion product labels and develop relevant EPA Endangered Species Protection Plan Bulletins to conserve listed species.
- RPM 2. Develop user education program, and incident tracking and reporting system.

26.4 Incidental Take Statement

Section 9(a)(1) of the ESA prohibits the taking of endangered species without a specific permit or exemption. Protective regulations adopted pursuant to section 4(d) of the ESA extend the prohibition to threatened species. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct (50 CFR 222.102). Harm is further defined by NMFS an act which actually kills or injures fish or wildlife, and may to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). Incidental take is defined as takings that result from, but are is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action, whether implemented as proposed or as modified by reasonable and prudent alternatives, is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement. NMFS cannot issue an Incidental Take Statement to cover any take of marine mammals that would also be prohibited under the Marine Mammal Protection Act, unless such take has been authorized pursuant to section 101(a)(5) of that Act. Consequently, any exemption of incidental take of marine mammals under this Incidental Take Statement is conditional upon the issuance of an authorization for such take under the MMPA.

26.4.1 Amount or Extent & Effects of Take

Section 7 regulations require NMFS to specify the impact of any incidental take of endangered or threatened species; that is, the amount or extent, of such incidental taking on the species (50 C.F.R. §402.14(i)(1)(i)). The amount of take represents the number of individuals that are expected to be taken by actions. As described earlier in this Opinion, the proposed action for this consultation is EPA's registrations of all pesticides containing chlorpyrifos, diazinon and malathion for use as described on product labels. The proposed action includes (1) approved product labels containing chlorpyrifos, diazinon and malathion, (2) degradates and metabolites of chlorpyrifos, diazinon and malathion, (3) formulations, including other ingredients within formulations, (4) adjuvants, and (5) tank mixtures. EPA is required to reassess currently registered pesticide active ingredients every 15 years. The EPA authorizes use of these pesticide products for pest control purposes across multiple landscapes. The goal of this Opinion is to evaluate the impacts to NMFS' listed resources from the EPA's broad authorization of applied pesticide products.

For this Opinion, NMFS anticipates the general direct and indirect effects that would occur from EPA's registration of pesticide products to 77 listed species under NMFS' jurisdiction during the 15-year duration of the proposed action. The RPA are designed to reduce exposure but not eliminate it. Pesticide runoff and drift of chlorpyrifos, diazinon, and malathion are most likely to reach streams and other aquatic sites when they are applied to crops and other land use settings located adjacent to wetlands, riparian areas, ditches, flood plain habitats, intermittent streams, nearshore estuarine and marine habitats. These inputs into aquatic habitats are especially high when rainfall immediately follows applications, or if wind conditions exacerbate inputs from drift. The effects of pesticides and other contaminants found in urban runoff, especially from areas with a high degree of impervious surfaces, may also exacerbate degraded water quality conditions of receiving waters. Urban runoff is also generally warmer in temperature, and elevated water temperature poses negative effects to many listed species. The range of effects of the 3 a.i.s on listed species includes killing species directly and reductions in prey leading to starvation and impaired growth. For example, impaired growth lends juveniles prone to becoming prey to predators, and starvation may make species more susceptible to disease. In addition, exposed individuals may change normal behaviors (e.g. feeding, sheltering, breeding, etc.). These results are not the purpose of the proposed action. Therefore, incidental take of listed species is reasonably certain to occur over the 15-year duration of the proposed action.

Given the variability of real-life conditions, the broad nature and scope of the proposed action, and the wide-ranging distributions of individuals of listed species, the best scientific and commercial data available are not sufficient to enable NMFS to estimate a specific amount of incidental take associated with the proposed action. As explained in the Description of the Proposed Action and the Effects of the Proposed Action sections, NMFS identified multiple uncertainties associated with the proposed action. Areas of uncertainty include:

1. Limited use and exposure data on stressors of the action for non-agricultural uses of these pesticides;
2. Minimal information on exposure and toxicity for pesticide formulations, adjuvants, and other/inert ingredients within registered formulations;
3. Minimal information on tank mixtures and associated exposure estimates;
4. Limited data on toxicity of environmental mixtures;
5. Variability in annual land use, crop cover, and pest pressure;
6. Temporal and spatial variability of individuals;
7. Pesticide concentrations in nearshore estuarine and marine habitats
8. Pesticide concentrations resulting from non-agricultural uses

Additionally, NMFS recognizes there are multiple impediments that reduce the likelihood of detecting take to listed species from the use of pesticides. It's important to place the significance of mortality incidents in the proper context. Vyas (1999) concluded that most wildlife mortality is unaccounted for as only a small fraction are likely observed, reported, and confirmed. The likelihood of detecting impacts becomes even more difficult in species with limited abundance. Sublethal impacts such as reduced reproduction are nearly impossible to detect without rigorous environmental monitoring. For these reasons, NMFS uses surrogates for the allowable extent of take of listed species, as described below within each of the species groupings.

Anadromous and Marine Fish

NMFS therefore identifies, as a surrogate for the allowable extent of take of anadromous and marine fish, the ability of this action to proceed without any fish kills within the action area attributed to the legal use of chlorpyrifos, diazinon or malathion, or any compounds, degradates, or mixtures affecting aquatic habitats containing listed species. Because of the difficulty of detecting mortality of listed species, individuals killed do not have to be listed species in order for their death to be considered a relevant surrogate for take. For example, salmonids are relatively sensitive to pesticides compared to other species of fish, so that if there are kills of other freshwater fishes attributed to use of these pesticides, it is likely that salmonids have also died, even if no dead salmonids can be located. In addition, if stream conditions due to pesticide use kill less sensitive fishes in certain areas, the potential for lethal and non-lethal takes in downstream areas increases. A fish kill is considered attributable to one of these three ingredients, its metabolites, or degradates, if any of the a.i.s is known to have been applied in the vicinity and may reasonably be supposed to have run off or drifted into the affected area, or if surface water samples or pathology indicate lethal levels of the a.i.(s).

NMFS notes that increased monitoring and study of the impact of these pesticides on water quality, particularly water quality in flood plain habitats, nearshore estuarine, and marine habitats will inform subsequent pesticide consultations and future incidental take statements. Such monitoring and studies will potentially allow other measures of the extent of take.

Marine Invertebrates

NMFS therefore identifies, as a surrogate for the allowable extent of take of marine invertebrates, the ability of this action to proceed without any mortality or adverse reproductive effects to corals or molluscs within the action area attributed to the legal use of chlorpyrifos, diazinon or malathion, or any compounds, degradates, or mixtures affecting aquatic habitats containing listed species. Because of the difficulty of detecting mortality of listed species, individuals killed or adversely affected do not have to be listed species in order for their death or adverse effects to be considered relevant surrogate for take. An adverse effect is considered attributable to one of these three ingredients, its metabolites, or degradates, if any of the a.i.s is known to have been applied in the vicinity and may reasonably be supposed to have run off or drifted into the affected area, or if surface water samples or pathology indicate lethal levels of the a.i.(s).

Sea Turtles

NMFS therefore identifies, as a surrogate for the allowable extent of take sea turtles, the ability of this action to proceed without any mortality or sublethal effects to sea turtles including adverse impacts to swimming or reproduction within the action area attributed to the legal use of chlorpyrifos, diazinon or malathion, or any compounds, degradates, or mixtures affecting aquatic habitats containing listed species. Because of the difficulty of detecting mortality of listed species, individuals killed or adversely affected do not have to be listed species in order for their death or adverse effects to be considered relevant surrogate for take. An adverse effect is considered attributable to one of these three ingredients, its metabolites, or degradates, if any of the a.i.s is known to have been applied in the vicinity and may reasonably be supposed to have

run off or drifted into the affected area, or if surface water samples or pathology indicate lethal levels of the a.i.(s).

Pinnipeds
NMFS therefore identifies, as a surrogate for the allowable extent of take of pinnipeds, the ability of this action to proceed without any mortality or adverse impacts to to pinniped swimming or reproduction attributed to the legal use of chlorpyrifos, diazinon or malathion, or any compounds, degradates, or mixtures affecting aquatic habitats containing listed species. Because of the difficulty of detecting mortality or other adverse effects to of listed species, individuals killed or adversely affected do not have to be listed species in order for their death or adverse effects to be considered relevant surrogate for take. An adverse effect is considered attributable to one of these three ingredients, its metabolites, or degradates, if any of the a.i.s is known to have been applied in the vicinity and may reasonably be supposed to have run off or drifted into the affected area, or if surface water samples or pathology indicate lethal levels of the a.i.(s).

Cetaceans - Southern Resident Killer Whale (SRKW)
NMFS therefore identifies, as a surrogate for the allowable take of SRKW, the ability of this action to proceed without any mortality to Pacific Salmonids attributed to the legal use of chlorpyrifos, diazinon, or malathion. Salmon, in particular Chinook salmon, are the prey for SRKW. Currently, the numbers of Chinook and other salmon are insufficient to support increases in the SRKW population size. The reduction in production of Pacific salmon throughout their range that would occur under the Proposed Action would therefore result in harm to SRKW by further reducing prey availability, which may cause animals to forage for longer periods, travel to alternate locations, or abandon foraging efforts. The extent of take from the Proposed Action is not anticipated to cause direct take by serious injury or mortality to SRKWs. However, the Proposed Action is expected to result in take in the form of a reduction in available prey.

26.5 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the Environmental Protection Agency must comply with the following terms and conditions, which implement the Reasonable and Prudent Measures described above. These include the take minimization, monitoring and reporting measures required by the section 7 regulations (50 C.F.R. §402.14(i)). These terms and conditions are non-discretionary. If the Environmental Protection Agency fails to ensure compliance with these terms and conditions and their implementing reasonable and prudent measures, the protective coverage of section 7(o)(2) may lapse.

To address RPM number 1, EPA shall implement the following revisions on all chlorpyrifos, diazinon, and malathion labels:

a. Prohibit application of pesticide products when wind speeds are greater than or equal to 10 mph.
b. Prohibit application of pesticide products when soil moisture is at field capacity, or when a storm event likely to produce runoff from the treated area is forecasted (by

NOAA/National Weather Service, or other similar forecasting service) to occur within 48 hours following application.

c. Prohibit co-application (tank mixing) with other neurotoxic pesticides (i.e., organophosphate, carbamate, pyrethroid, and neonicotinoid pesticides).

To implement RPM number 2, EPA shall:

a) Provide home owner and commercial applicator training on relevant endangered species and designated critical habitats including information on risk reduction measures, best management practices, etc.
b) Report all incidents of mortality and adverse effects to non-target species that occur within the vicinity of the treatment area, including areas downstream and downwind, in the four days following application of and of these a.i.s to EPA's Office of Pesticide Programs (phone: 703-305-7090). Within one year of receipt of this Opinion, EPA shall submit an annual report to NMFS Office of Protected Resources that identifies the total number of non-target species affected and incident locations.
c) EPA shall, in close coordination with NMFS Office of Protected Resources, develop and implement an effectiveness monitoring plan for aquatic habitats. A report summarizing annual monitoring data and including all raw data shall be submitted to NMFS Office of Protected Resources and will summarize annual monitoring data and provide all raw data.
d) EPA shall include the following instructions requiring reporting of mortality events either on the labels for all products containing chlorpyrifos, diazinon, and malathion in ESPP Bulletins:

   NOTICE: Incidents where listed species appear injured or killed as a result of pesticide applications shall be reported to NMFS Office of Protected Resources at 301-713-1401 and EPA's Office of Pesticide Programs. The finder should leave the individuals alone, make note of any circumstances likely causing the death or injury, location and number of individuals involved, and take photographs, if possible. Individuals should generally not be disturbed unless circumstances arise where the individual is obviously injured or killed by pesticide exposure, or some unnatural cause. NMFS Office of Protected Resources or Office of Law Enforcement may request the finder to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved.
e) EPA shall report to NMFS Office of Protected Resources any incidences regarding chlorpyrifos, diazinon, and malathion effects on aquatic ecosystems added to its incident database that it has classified as probable or highly probable.
f) EPA shall provide OPR a commencement date for annual reporting of monitoring results.

26.6 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on ESA-listed species or critical habitat, to help implement recovery plans or develop information (50 C.F.R. §402.02).

The following conservation recommendations would provide information for future consultations involving future authorizations of pesticide active ingredients that may affect ESA-listed species:

1. Develop models that more accurately quantify pesticide exposure in estuarine and near-shore ocean environments.
2. Work with other appropriate federal, state, and local partners to determine efficacy of riparian area management methods in reducing pesticide loading from authorized uses especially the types of vegetation and width of riparian areas needed.
3. Identify and implement other methods that eliminate or significantly reduce pesticide loading into species' habitats.
4. Carryout educational outreach on pesticide risks to threatened and endangered species to pesticide users in high use agriculture and residential environments.
5. Develop improved methods for characterizing exposure from non-agricultural uses.
6. Develop criteria that addresses when pesticide-contaminated sediment is an important route of exposure to aquatic organisms.

In order for NMFS' Office of Protected Resources Endangered Species Act Interagency Cooperation Division to be kept informed of actions minimizing or avoiding adverse effects on, or benefiting, ESA-listed species or their critical habitat, the Environmental Protection Agency should notify the Endangered Species Act Interagency Cooperation Division of any conservation recommendations they implement in their final action.

26.7 Reinitiation Notice

This concludes formal consultation for the Environmental Protection Agency's proposed registration of pesticide products containing chlorpyrifos, diazinon, and malathion to ESA-listed species under the jurisdiction of the NMFS. As 50 C.F.R. §402.16 states, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if:

1. The amount or extent of taking specified in the incidental take statement is exceeded.
2. New information reveals effects of the agency action that may affect ESA-listed species or critical habitat in a manner or to an extent not previously considered.
3. The identified action is subsequently modified in a manner that causes an effect to ESA-listed species or designated critical habitat that was not considered in this opinion.
4. A new species is listed or critical habitat designated under the ESA that may be affected by the action.

NMFS' analysis and conclusions are based on EPA's action. If changes to product labeling result in modifications to the action that were not considered in this Opinion, including but not limited to label modifications authorizing pesticide application to new locations, additional application methods, or increased application rates or numbers of applications, EPA must contact NMFS to discuss reinitiation. If reinitiation of consultation appears warranted due to one or more of the above circumstances, EPA must contact NMFS Office of Protected Resources, ESA Interagency Cooperation Division. In the event reinitiation conditions (1), (2), or (3) is met, reinitiation will be only for the a.i.(s) which meet that condition, not for all 3 a.i.s considered in the Opinion. If none of these reinitiation triggers are met within the next 15 years, then reinitiation will be required because the Opinion only covers the action for 15 years. It is recommended that EPA

request reinitiation with sufficient time prior to reaching 15 years to allow sufficient time to consult and to prevent lapse of coverage for the active ingredients in this Opinion.